Claims listing:

1. (currently amended) A diode pumped, intracavity doubled laser, comprising:

at least two resonator mirrors defining a resonator cavity;

an Nd:YVO_4 laser crystal positioned in the resonator cavity;

an LBO doubling crystal positioned in the resonator cavity;

a diode pump source supplying a pump beam to the laser crystal and producing ~~a laser crystal~~ an intracavity beam with at least one axial mode ~~that are~~ incident on the doubling crystal to produce a frequency doubled output beam with an output power of at least 1 watt and an optical efficiency of at least 20%, wherein the diode pump source is configured to be coupled to a power supply.

2. (original) The laser of claim 1, wherein the output power is at least 2 watts.

3. - 4 (cancelled)

5. (original) The laser of claim 1, wherein the output power is at least 5 watts.

6. (original) The laser of claim 1, wherein the output power is at least 10 watts.

7. (original) The laser of claim 1, wherein the output power is at least 15 watts.

8. (original) The laser of claim 1, wherein the output power is at least 20 watts.

9. (original) The laser of claim 1, wherein the doubled output beam has a % RMS noise of less than 0.5%.

10. (original) The laser of claim 1, wherein the doubled output beam has a % RMS noise of less than 0.3%.

11. (cancelled).

12. (original) The laser of claim 1, wherein the doubled output beam has a % RMS noise of less than 0.1%.

13. (original) The laser of claim 1, wherein the diode pump source is a diode bar.

14. (original) The laser of claim 1, wherein the diode pump source is a plurality of diode bars.

15. (original) The laser of claim 1, wherein the diode pump source is fiber-coupled.

17. (cancelled).

16. (currently amended) The laser of claim 1, wherein at least ~~four~~ three axial modes are incident on the doubling crystal.

18. (original) The laser of claim 1, wherein at least 10 axial modes are incident on the doubling crystal.

19. (original) The laser of claim 1, wherein the output beam is substantially TEM_{oo}.

20. (new) The laser of claim 1, wherein the doubling crystal is cut for type I non-critical phase matching.

21. (new) The laser of claim 1 wherein the laser crystal has a geometric configuration with a lateral dimension greater than an axial dimension along which the intracavity beam propagates, and adapted for co-axial cooling and intracavity beam propagation.

22. (new) A diode pumped, intracavity doubled laser, comprising:

at least two resonator mirrors defining a resonator cavity;

an Nd:YVO_4 laser crystal positioned in the resonator cavity;

an LBO doubling crystal positioned in the resonator cavity;

a diode pump source supplying a pump beam to the laser crystal and producing an intracavity beam with at least one axial mode that are incident on the doubling crystal to produce a frequency doubled output beam with an output power of at least 1 watt, the diode pump source being configured to be coupled to a power supply wherein an electrical diode power to optical output power efficiency of the intracavity doubled laser is at least 8%.

23. (new) The laser of claim 22, wherein the doubling crystal is cut for type I non-critical phase matching.

24. (new) The laser of claim 22, wherein the laser crystal is cut in a configuration adapted for co-axial cooling and intracavity beam propagation.

25. (new) The laser of claim 22, wherein the laser crystal has a geometric configuration with a lateral dimension greater than an axial dimension along which the intracavity beam propagates, and adapted for co-axial cooling and intracavity beam propagation.

26. .(new) The laser of claim 25 wherein the laser crystal configuration is adapted for cooling along a direction co-axial with intracavity beam propagation.